

# COMETS

## COMmunities Educating Tomorrow's Scientists

11<sup>th</sup> Annual GLOBE Conference

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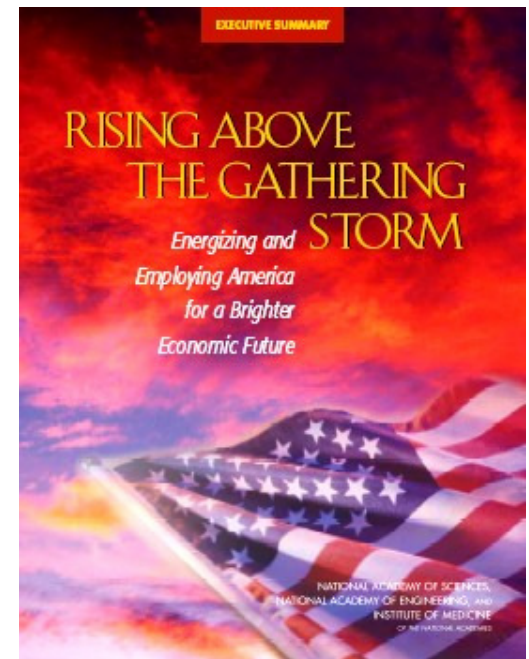
Michael Corrigan, Marshall University





# What's most important to...

- Inspire the next generation of earth scientists..
- Math Scores or Science Interest?



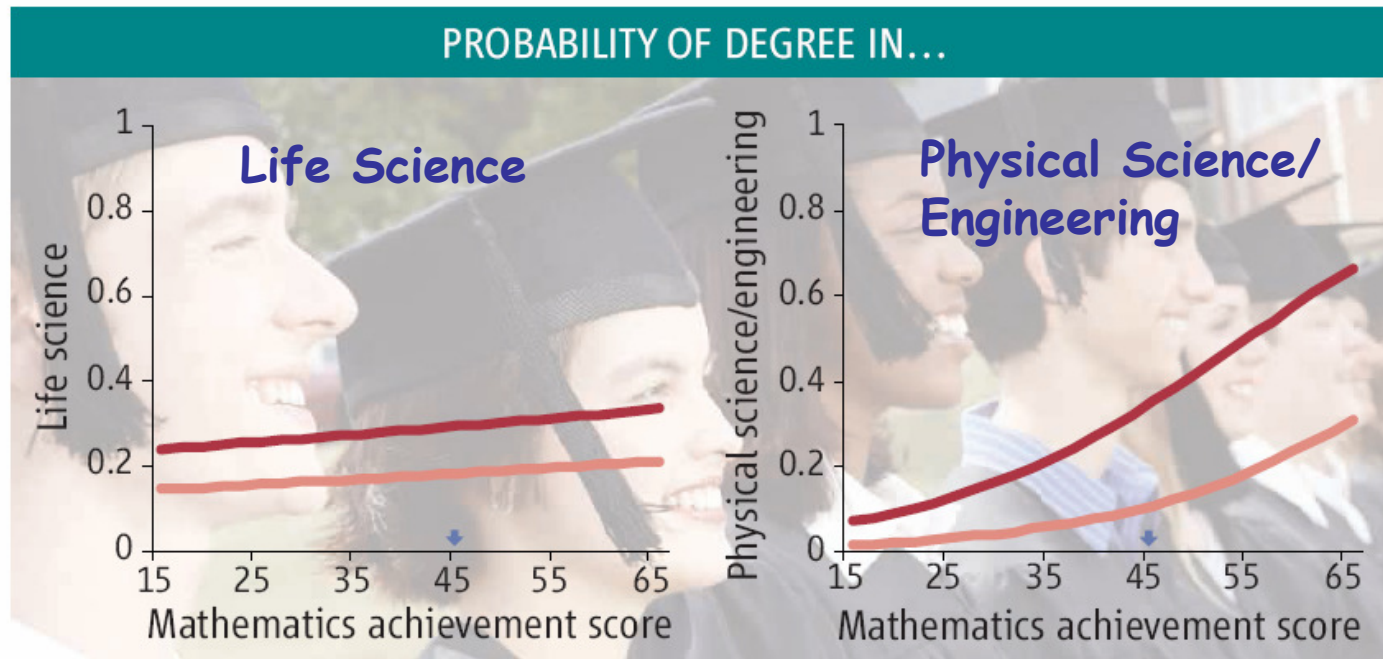


# National Educational Longitudinal Study

- “What kind of work do you expect to be doing when you are 30?”
- Asked to over 12,000 eighth graders in 1988
- Follow-up surveys administered in 1990, 1992, 1994, 2000
- Researchers from UVA looked for correlation between expressed work preference in 8<sup>th</sup> grade and ultimate college degree.



# Probability of Degree



**Estimated probability comparisons.** Probability that students who, in eighth grade, expected (dark line) or did not expect (light line) a science career would achieve a life science degree (left) or a physical science/engineering degree (right). Blue arrow designates the average mathematics achievement score.

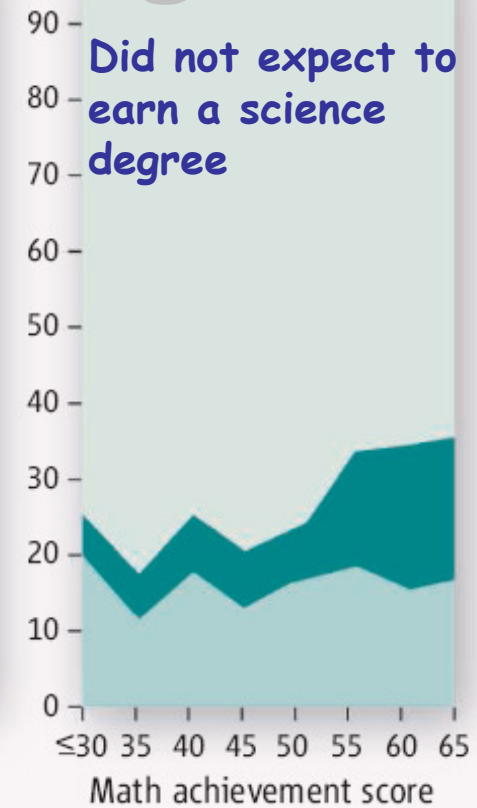
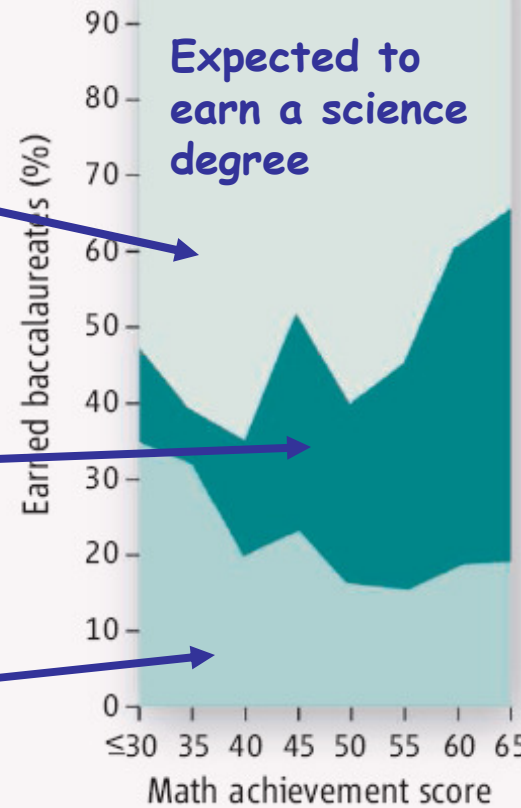
Data from  
Article in  
*Science*  
(Tai 2006)

# Proportion of earned baccalaureate degrees

Non-  
Science  
fields

Physical  
Science/  
Engineering

Life  
Sciences



Proportion of earned baccalaureates. Degrees in life science (light green), physical science/engineering (dark green), and nonscience fields (gray). Students who in eighth grade expected a science degree are shown on the left ( $n = 337$ ); those who did not expect a science degree are shown on the right ( $n = 3022$ ).

Data from  
Article in  
*Science*  
(Tai 2006)

# Results from NELS Study

- Students who expressed interest in a scientific career in 8<sup>th</sup> grade were
  - **Two times** more likely to have graduated with a degree in the **life sciences** and
  - **Three times** more likely to have a degree in the **physical/engineering sciences**.

Data from  
Article in  
*Science*  
(Tai 2006)



# NSF Academies for Young Scientists

- 16 funded projects around United States required to:
  - Provide K-8 students with 150 science contact hours outside formal classroom
  - Integrate both formal and informal education
  - Incorporate local school district, higher education, local industry and informal science education communities



# COMETS Partners



- Marshall University
- NASA IV&V Educator Resource Center
- Kanawha County Schools
- Charleston/Dunbar Community Centers
- Bayer Crop Science Corporation
- Clay Center for the Sciences and Arts - West Virginia, INC





# COMETS' Project Goals

- Expand student interest in science
- Excite, inspire, support academic achievements
- Extend regular school time learning experiences
- Incorporate after-school and summer programs





# Program Objectives

- Involve students in **active collection and analysis** of environmental data,
- Better prepare students to succeed in **laboratory sciences**,
- Increase students' **critical thinking skills**,
- Strengthen **parental support** for science education, and
- Promote **positive attitudes** towards careers in science.



# Project Focus

- NASA-centered Earth and Space Science
- Curriculum Materials
  - Foundation of Scott Foresman *Science Companion*
    - Student Journals
    - Guided scientific explorations
  - Integrate GLOBE observations and materials
  - Align activities with formal curriculum





# Audience

- **Six Community Centers in Charleston, WV**
  - 77% of children at lead Center have or have had an immediate family member incarcerated
- **Target Population**
  - 200 students
  - grades 2-4
  - 50 educators (Formal, informal and pre-service)

## Partner School Demographics

School	% Free Lunch
Stonewall Jackson Middle	66%
Dunbar Middle	58%
Glenwood Elementary	83%
Piedmont Elementary	83%



# Program Design and Components

- **Out-School-Time Instruction**
  - Two/Four hours per week at 6 Community Centers over 2 years
- **Family Participation Program**
- **Educator Professional Development**
  - Formal and Informal Educator Workshop Series
  - Professional Learning Communities
  - Learning Expeditions
- **Pre-service Teacher Program**

# Teaching Strategy

- *Learning science AS inquiry*
- Based on methods used by AMNH-NASA Afterschool Program
  - the GLOBE Program
  - Co-Inquiry method
  - Science Talks
- Students developing scientific habits of mind







# Science Habits of Mind

- Students will develop “science” habits (Hodson 1988):
  - **express** their own ideas,
  - **explore** implications of their own ideas,
  - **experiment** with ideas from their experiences,
  - **explain** new observations from new experiences, and
  - **expand** original idea to match new observations.



# Science Process Skills

- From the recent NRC Report:  
*Taking Science to School*
- Current questions about the “middle aged” child's abilities





# Formal Educators

- Serve as key to cohesive alignment with formal science instruction
- Lead Professional Learning Communities
- Participate in Professional Development
  - Workshop Series
  - Learning Adventures





# Informal Educators

- Important catalyst to motivate and inspire children
- Model “being a scientist”
- Replace “I don’t know” answers to student’s question with
  - “That’s a good question, let’s find out”
- Participate in Professional Development
  - Workshop Series
  - Learning Adventures

# Pre-Service Educators



- Serve as true facilitators for COMETS
- Receive training to lead/assist informal educators with COMETS
- Receive academic credit/clinical hours in baccalaureate programs

# Inspiring students to..

- Value science,
- Understand the practice of science, and
- Choose science for their future education and employment opportunities.





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